

**This Page Is Inserted by IFW Operations  
and is not a part of the Official Record**

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representation of  
The original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- **BLACK BORDERS**
- **TEXT CUT OFF AT TOP, BOTTOM OR SIDES**
- **FADED TEXT**
- **ILLEGIBLE TEXT**
- **SKEWED/SLANTED IMAGES**
- **COLORED PHOTOS**
- **BLACK OR VERY BLACK AND WHITE DARK PHOTOS**
- **GRAY SCALE DOCUMENTS**

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

This Page Blank (uspto)



3619  
57.  
PATENT  
Attorney Docket No. 214711  
4-23-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Didier GLOAGUEN

Application No. 10/004,984

Filed: December 3, 2001

For: PROTECTIVE COVERS

Art Unit: 3619

Examiner: Unassigned

RECEIVED

APR 22 2002

GROUP 3600

Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

In accordance with the provisions of 35 USC 119, Applicant claims the priority of the application or the applications (if more than one application is set out below):

Application No. 0029621.0, filed in the United Kingdom on  
December 5, 2000.

Certified copies of the above-listed priority documents are enclosed.

Respectfully submitted,

Gordon R. Coons, Reg. No. 20821  
One of the Attorneys for Applicant(s)  
LEYDIG, VOIT & MAYER, LTD.  
Two Prudential Plaza, Suite 4900  
180 North Stetson  
Chicago, Illinois 60601-6780  
telephone: (312) 616-5600  
facsimile: (312) 616-5700

Date: March 26, 2002

CERTIFICATE OF MAILING

I hereby certify that this CLAIM OF PRIORITY (along with any documents referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231.

Date: 4/8/02

This Page Blank (uspto)



PATENT  
Attorney Docket No. 214711

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
In re Application of:

Didier GLOAGUEN

Application No. 10/004,984

Filed: December 3, 2001

For: PROTECTIVE COVERS

Art Unit: 3619

Examiner: Unassigned

**RECEIVED**

APR 22 2002

**GROUP 3600**

**CLAIM OF PRIORITY**

Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

In accordance with the provisions of 35 USC 119, Applicant claims the priority of the application or the applications (if more than one application is set out below):

Application No. 0029621.0, filed in the United Kingdom on  
December 5, 2000.

Certified copies of the above-listed priority documents are enclosed.

Respectfully submitted,

Gordon R. Coons, Reg. No. 20821  
One of the Attorneys for Applicant(s)  
LEYDIG, VOIT & MAYER, LTD.  
Two Prudential Plaza, Suite 4900  
180 North Stetson  
Chicago, Illinois 60601-6780  
telephone: (312) 616-5600  
facsimile: (312) 616-5700

Date: March 26, 2002

**CERTIFICATE OF MAILING**

I hereby certify that this CLAIM OF PRIORITY (along with any documents referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231.

Date: 4/8/02

3970  
100-1000  
This Page Blank (uspto)



USA



INVESTOR IN PEOPLE

The Patent Office  
Concept House  
Cardiff Road  
Newport  
South Wales  
NP10 8QQ

RECEIVED  
APR 22 2002  
GROUP 3600

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation and Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein together with the Statement of inventorship and of right to grant of a Patent (Form 7/77), which was also filed.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

Signed

*Anastasios.*

Dated

13 February 2002

This Page Blank (uspto)



The Patent Office

Statement of inventorship and of  
right to grant of a patent

The Patent Office

Cardiff Road  
Newport  
Gwent NP9 1 RI 11. Your reference  
1/P32475GB2. Patent application number  
(if you know it)

0029621.0

05 DEC 2000

3 Full name of the or of each applicant

DRAFTEX INDUSTRIES LIMITED

4. Title of the invention

PROTECTIVE COVERS

5. State how the applicant(s) derived the right  
from the inventor(s) to be granted a patentby virtue of the inventor's employment by an associated  
company of the Applicants and by virtue of the assignment to  
them.6. How many, if any, additional Patents Forms  
7/77 are attached to this form?  
(see note (c))

NIL

7. I/We believe that the person(s) named over the page (and on  
any extra copies of this form) is/are the inventor(s) of the invention  
which the above patent application relates to.

Signature

Date 5th December 2000

MATHISEN, MACARA &amp; CO.

8. Name and daytime telephone number of  
person to contact in the United Kingdom

MR D.M. FOSTER (01895 678331)

## Notes

- If you need help) to fill in this form or you have any questions, Please contact the Patent Office on 0645 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there are more, than three inventors, please write the names and addresses of the other inventors on the back of another Patents Form 7/77 and attach it to this form.
- When an application does not declare any priority, or declares priority from an earlier UK application, you must provide enough copies of this form so that the Patent Office can send one to each inventor who is not an applicant.
- Once you have filled in this form you must remember to sign and date it

Enter the full names, addresses and postcodes of the inventors in the boxes and underline the surnames

Didier GLOAGUEN  
6, chemin des Grands Jardins  
La Crespelière  
44310 Saint Philbert de Grand Lieu  
FRANCE

Patents ADP number (*if you know it*): 8037079001

Patents ADP number (*if you know it*).

Reminder

Have you signed the form?

Patents ADP number (*if you know it*):

The Patent  
Office06DEC00 E589056-1 D02855  
P01/7700 0.00-0029621.0

## Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form.)

The Patent Office

Cardiff Road  
Newport  
Gwent NP9 1 RH

1. Your reference 1/P32475GB

2. Patent application number  
(The Patent Office will fill in this part)

0029621.0

05 DEC 2000

3. Full name, address and postcode of the or of  
each applicant (underline all surnames)

DRAFTEX INDUSTRIES LIMITED

7 Castle Street  
Edinburgh  
EH2 3AP

Patents ADP number (if you know it)

U.K. 415760004

4. Title of the invention

PROTECTIVE COVERS

5. Name of your agent (If you have one)

MATHISEN &amp; MACARA &amp; CO.

"Address for service" in the United Kingdom  
to which all correspondence should be sent  
(including the postcode)The Coach House  
6-8 Swakeleys Road  
Ickenham, Uxbridge  
UB10 8BZ

Patents ADP number (if you know it)

1073001 ✓

6. If you are declaring priority from one or more  
earlier patent applications, give the country  
and the date of filing of the or of each of these  
earlier applications and (If you know it) the or  
each application number

Country

Priority application number  
(if you know it)Date of filing  
(day / month / year)7. If this application is divided or otherwise  
derived from an earlier UK application,  
give the number and the filing date of  
the earlier application

Number of earlier application

Date of filing  
(day / month / year)8. Is a statement of inventorship and of right  
to grant of a patent required in support of  
this request? (Answer 'Yes' if:  
a) any applicant named in part 3 is not an inventor, or  
b) there is an inventor who is not named as an  
applicant, or  
c) any named applicant is a corporate body.  
See note (d))

YES

9. Enter the number of sheets for any of the following items you are filing with this form.  
Do not count copies of the same document

Continuation sheets of this form

Description 8

Claim(s) 3

Abstract 1

Drawing(s) 3 *+3* *4*

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77) 2

Request for preliminary examination and search (Patents Form 9/77) 1

Request for substantive examination (Patents Form 10/77)

Any other documents  
(please specify)

11.

1/We request the grant of a patent on the basis of this application.  
Signature \_\_\_\_\_ Date \_\_\_\_\_

*5TH December 2000*

12. Name and daytime telephone number of person to contact in the United Kingdom

MR D.M. FOSTER (01895 678331)

#### Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

#### Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any Part of this form, Please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office

PROTECTIVE COVERS

The invention relates to protective covers and more particularly but not exclusively to protective covers for protecting moving parts in a mechanism of motor vehicles.

According to the invention, there is provided a protective cover for a motor vehicle joint, the cover having a deformable structure defining an interior space closed at both ends and including vent means coupled to the interior space, the vent means including a vent element adapted to allow fluid flow thereacross whilst stopping contaminant and/ or water entering into the interior space whereby excess fluid pressure within the interior can be reduced by fluid evacuation and aspiration through the vent means.

Typically, the fluid will be air.

Protective covers embodying the invention will now be described, by way of example with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a schematic front elevation of a steering arrangement with protective covers;

Figure 2 is a schematic front elevation of the steering arrangement depicted in Figure 1 turned to the right;

Figure 3 is a schematic front elevation of the steering arrangement depicted in Figures 1 and 2 turned to the right and subject to suspension articulation;

Figure 4 is a schematic front elevation of a transmission arrangement with protective covers;

Figure 5 is a cross-section through one of the protective covers embodying the invention;

Figure 6 is an enlarged view of the portion of Figure 5 shown at II; and,

Figure 7 is an end view of part of a connector shown in Figure 6, looking in the direction of the arrow III;

The protective cover arrangement 10 shown in Figures 5 and 6 comprises a small diameter sealing collar 12 at one end and a larger diameter sealing collar 14 at the opposite end, with a plurality of bellows turns 16 integrally extending between the two ends. In use, the two sealing collars are attached to two relatively movable parts of a mechanism (not shown) which is to be protected in a motor vehicle. The cover 10 protects the mechanism from ingress of water, dirt and other contamination.

In one particular application of the protective cover shown in Figures 1 to 3, two of them are respectively mounted to protect the ends of a steering rack of a steering arrangement

100 in a vehicle. Thus, the steering arrangement 100 may comprise a steering box 104 operated directly by the driver's steering wheel 105 or through the intermediary of a power steering arrangement. A steering rack extends outwardly in opposite directions from each side of the steering box 104 and is moved axially in one or the other direction by the steering box in response to steering action by the driver. The opposite ends of the rack are connected to turn the steerable wheels 103 of the vehicle. In use, a cover 110 extends from one side of the steering box 104, with its larger diameter fixing collar 114 being secured to the steering box 104 where the steering rack extends outwardly therefrom. The smaller diameter collar 112 of the cover 110 is secured to the distal end of the rack.

At the opposite side of the steering box 104, from which the second end of the rack protrudes, a second cover 110 is secured, with its smaller diameter collar 112 fixed to that distal end of the steering rack.

The two protective covers 110 thus protect the two end portions of the rack and the bellows flexibly accommodate axial movement.

As the steering rack moves to and fro, in order to carry out desired steering action, the two protective covers 110 will be alternately compressed and expanded as will now be explained in more detail.

It will be noted from Figure 1 that the steering arrangement depicted has wheels 103 in a straight-ahead configuration. Thus, the steering box 104 is not displacing the steering rack either to the right or the left. In such circumstances, the protective covers 110 are not generally deformed (that is, not compressed or stretched), and so the interior volumes of these covers 110 will be substantially at their designed pressure, normally atmospheric. Thus, these covers 110 should not rupture, create noise problems or alter the function of the underlying steering mechanism.

In Figure 2, the steering arrangement of Figure 1 has been turned to the right. Thus, cover 110a is compressed whilst cover 110b is expanded. The covers 110 are sealed by collars 112, 114 at each end. Therefore, the compressed cover 110a would normally be at an elevated pressure whilst the expanded cover 110b would be at a reduced pressure.

Similarly, in Figure 3, the covers 110 are respectively further expanded (110b) and compressed (110a) by suspension 111 movement to accommodate bumps as the vehicle including the steering arrangement moves.

Figure 4 shows how a similar problem can arise with a drive shaft or transmission arrangement. A drive shaft 201 extends between an outboard joint 230 and an inboard joint 231. The outboard joint 230 is supported by a suspension 233 and the wheel 234. In such circumstances, the protective covers 232 can be angled and the protective cover 236 can be compressed or expanded. The pressure variation appears only in the inboard

joint 231.

It is necessary to accommodate the resultant changes in pressure in the protective covers. If this is not done, excessive pressure may rupture the protective covers. One known way of dealing with this problem, is to interconnect the interiors of the two covers used at respective ends of a steering rack. In this way, when one cover is contracted by movement of the steering rack, the increased pressure within the now deformed cover is transmitted to the interior of the other cover which will at the same time be expanded.

In accordance with a feature of the covers being described, this interconnection between the two bellows at opposite ends of the steering rack is removed in order to allow easier assembly and to reduce costs.

Referring to Figure 5, the bellows 10 there shown has a vent arrangement 20 at one end. The vent 20 is L-shaped in form, comprising a relatively long hollow tubular part 22 and a relatively short hollow tubular part 24. Each part 22,24 has an open end 22A,24A. As shown in Figures 5 and 6, the vent 20 is secured in position on the cover 10 so that the end 24A is attached to the wall of the bellows adjacent the larger diameter collar 14 and with the hollow interior of the part 24 thus open to the interior 25 of the cover 10. The part 24 of the vent 20 thus extends radially of the major axis of the cover 10 and the part 22 of the connector extends in an axial direction.

Such a bellows 10 can therefore be mounted at one end of a steering rack (for example, as shown in Figures 1 to 3) or at one end of a drive shaft (for example, as shown in Figure 4). A similar bellows would then be mounted at the other end of the steering rack or drive shaft.

The vent 20 of the bellows 10 at the other end of the rack or drive shaft would be mounted on the bellows in the same way.

Each vent 20 is very firmly secured to the bellows 10. A welding operation can be used to form a very strong welded bond between the material of the vent 20 and the material of the bellows 10. In addition, a mechanical bond is formed between the vent 20 and the material of the bellows 10 where it enters the end 24A of the vent 20. However, the vent 20 could be mounted on the bellows 10 by a glueing operation.

It will be appreciated that the vent 20 can be situated at any desired position on the external wall of the bellows.

At the open end of 22a of each vent 20, a vent element 21 is located. The purpose of this element 21 is to allow air to pass into and out of the bellows 10 whilst preventing ingress of contaminants and water to the interior volume 25.

In effect, the vent 20 and the vent element 21 adjust the volume of air within the interior

so that it is consistent with air pressure. In such circumstances, the vent element 21 acts as a filter to prevent transfer of contaminants, such as grit, grease, etc. and water, into the interior, allowing relatively free movement of air to adjust the volume of the interior 25 as the cover 10 is deformed in extension or compression. In such circumstances, the vent 20 prevents excessive fluid (air) pressure build-up in the interior 25 and will normally maintain that interior at about atmospheric pressure. Furthermore, with a lubricant inside the protective cover 10 it will be understood this lubricant is prevented from escaping and so facilitating continued lubrication of a protected mechanism.

The vent element 21 can be formed of a Teflon (Trade Mark) material of calibrated porosity to allow air movement but to prevent contaminants or water entering the interior 25. Clearly, the specific material used is dependent upon the installation requirements; suitable other materials may be used.

The vent 20 and vent element 21 remove the necessity of a connecting tube between the pair of protective covers 10. Thus, installation and maintenance of the cover 10 is made less difficult and costly.

In order to extend the operational life of vent element 21, it will be understood that at least a proportion of any contaminants and/or water will be removed from the element 21 as air or fluids flow out of the interior 25.

This vent works also to avoid any variation of pressure due to external temperature or atmospheric pressure variation.

CLAIMS

1. A protective cover for a motor vehicle articulating joint, the cover having a deformable structure defining an interior space closed at both ends and including vent means coupled to the interior space, the vent means including a vent element adapted to allow fluid flow thereacross whilst stopping contaminants and/ or water entering into the interior space whereby excess fluid pressure within the interior can be reduced by fluid evacuation and aspiration through the vent means.
2. A cover as claimed in claim 1, wherein the fluid is air.
3. A cover as claimed in claim 1, 2 or 3, wherein the deformable structure is a flexible bellows.
4. A cover as claimed in claim 1, 2 or 3, wherein the deformable structure is secured at each end with a respective collar element.
5. A cover as claimed in any one of claims 1 to 4, wherein the fluid pressure within the interior is maintained at a desired fluid pressure.
6. A cover as claimed in claim 4, wherein the desired fluid pressure is that of the ambient atmospheric air pressure adjacent the protective cover.

7. A protective cover as claimed in any preceding claim , wherein the vent means is located at one end of the deformable structure.
8. A cover as claimed in any preceding claim, wherein the vent element comprises a porosity-calibrated material structure.
9. A cover as claimed in claim 8, wherein the material structure is a Teflon.
10. A cover as claimed in any preceding claim, wherein the vent element is replaceable in the vent means.
11. A cover as claimed in any preceding claim, wherein the vent element is adapted to expel at least some of any contaminates and/or water associated with it upon outward fluid movements through the vent element as the deformable structure and therefore the interior space is deformed.
12. A cover as claimed in any preceding claim, wherein the vent means is configured as a spout comprising a first portion outwardly perpendicular to the major axis of the cover and a second portion parallel to that major axis of the cover whereby the vent means has a substantially "L" shaped configuration.
13. A cover as claimed in any preceding claim, made from an elastomeric material.

14. A cover as claimed in any preceding claim, wherein the vent means is arranged to allow fluid air flow thereacross.
15. A cover as claimed in any preceding claim wherein the vent means is adapted to prevent lubricant escaping from the interior space.
16. A protective cover arrangement, comprising protective covers as claimed in any preceding claim respectively secured about the ends of a steering arrangement within a motor vehicle in order to protect that steering arrangement.
17. A protective cover arrangement comprising protective covers as claimed in any of claims 1 to 15 secured about a motor vehicle transmission joint to protect that transmission joint.
18. A protective cover substantially as described with reference to Figures 5 and 6 of the accompanying drawings.
19. A protective cover arrangement substantially as described with reference to Figures 1 to 3 and figures 5 to 7 of the accompanying drawings.
20. A protective cover arrangement substantially as described with reference to Figures 4 to 7 of the accompanying drawings.

ABSTRACT

A protective cover (10) which is generally in the form of a flexible bellows construction secured at each end by collars (12, 14) in order to define an interior space (25) includes vent means (20). Thus, when the cover (10) is deformed, the volume within the interior (25) is altered by aspiration or evacuation through the vent means (20). The vent means (20) includes a vent element (21) in order to allow air or fluid transfer into and out of the interior (25) but prevent ingress of contaminants such as grit and water to the interior (25).

Figure 5

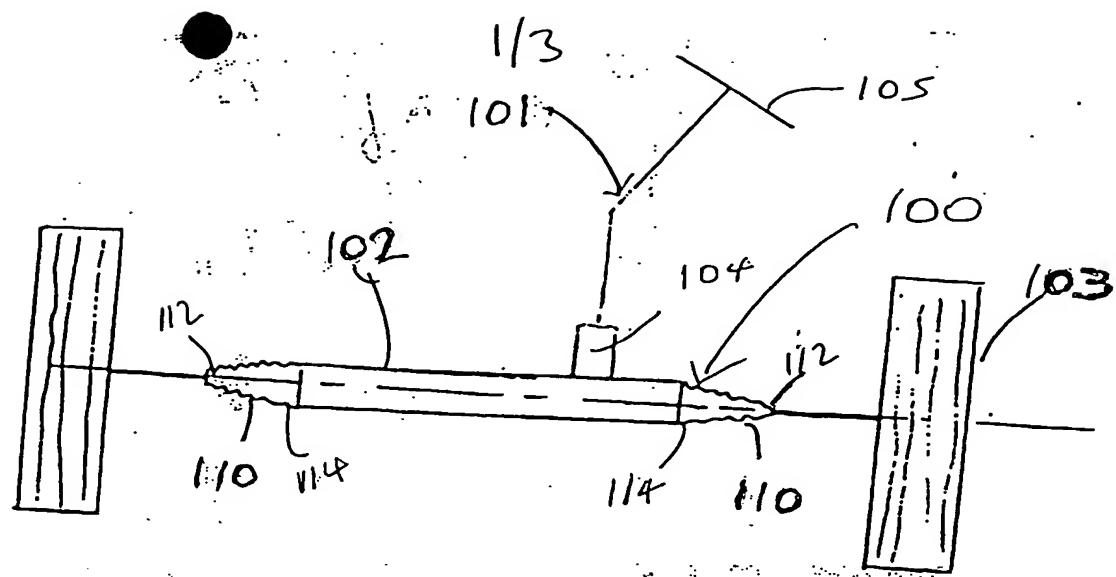


Figure 1

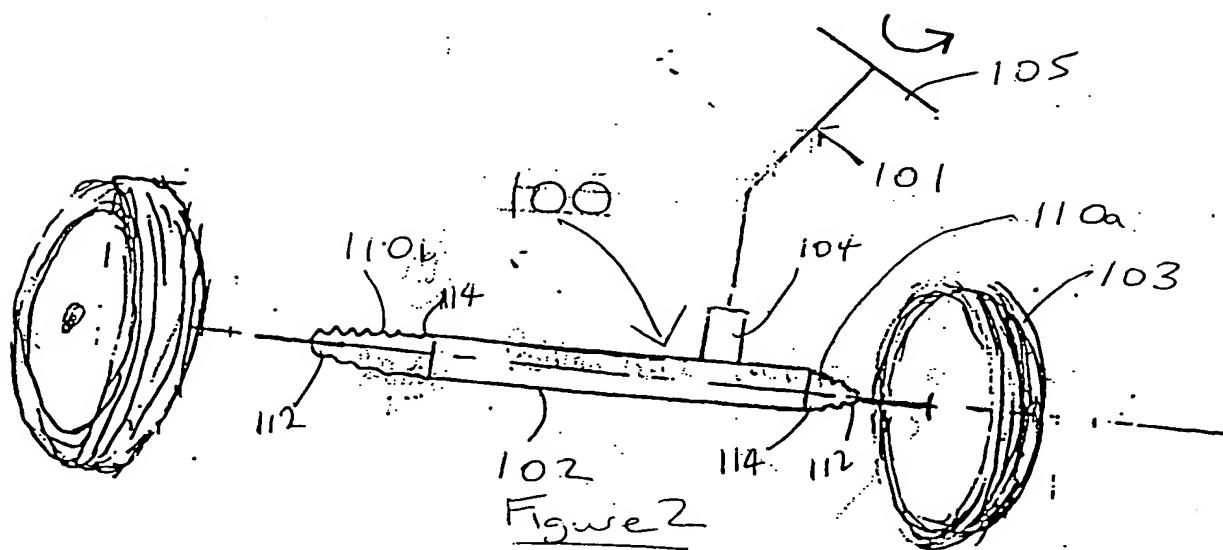
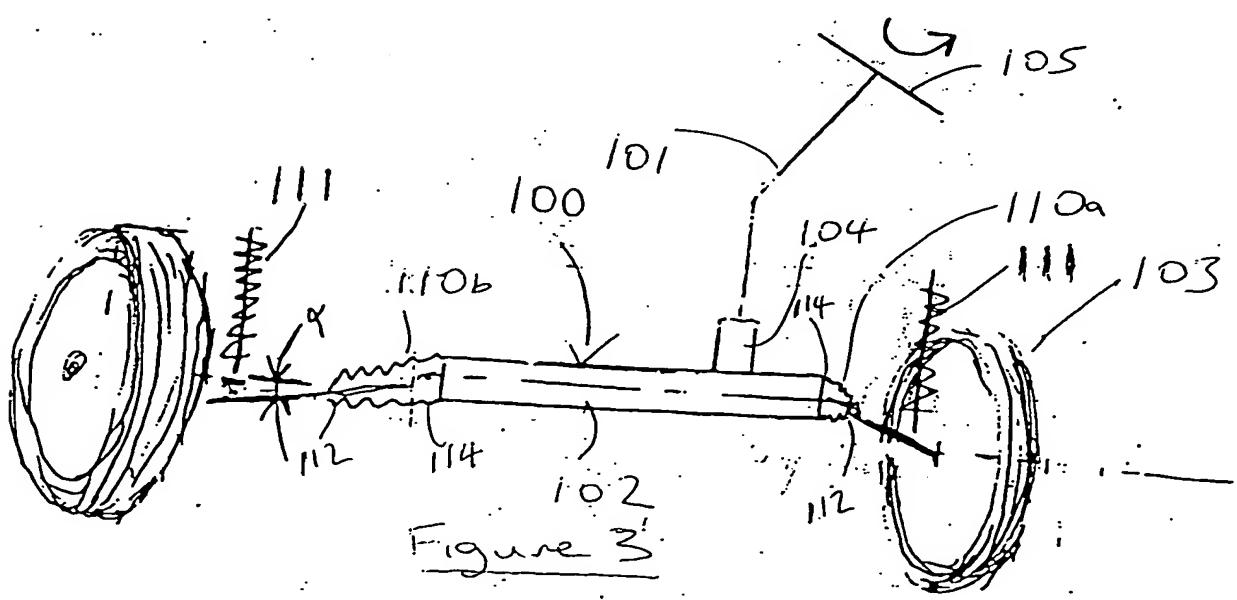


Figure 2



3000

This Page Blank (uspto)

2/3

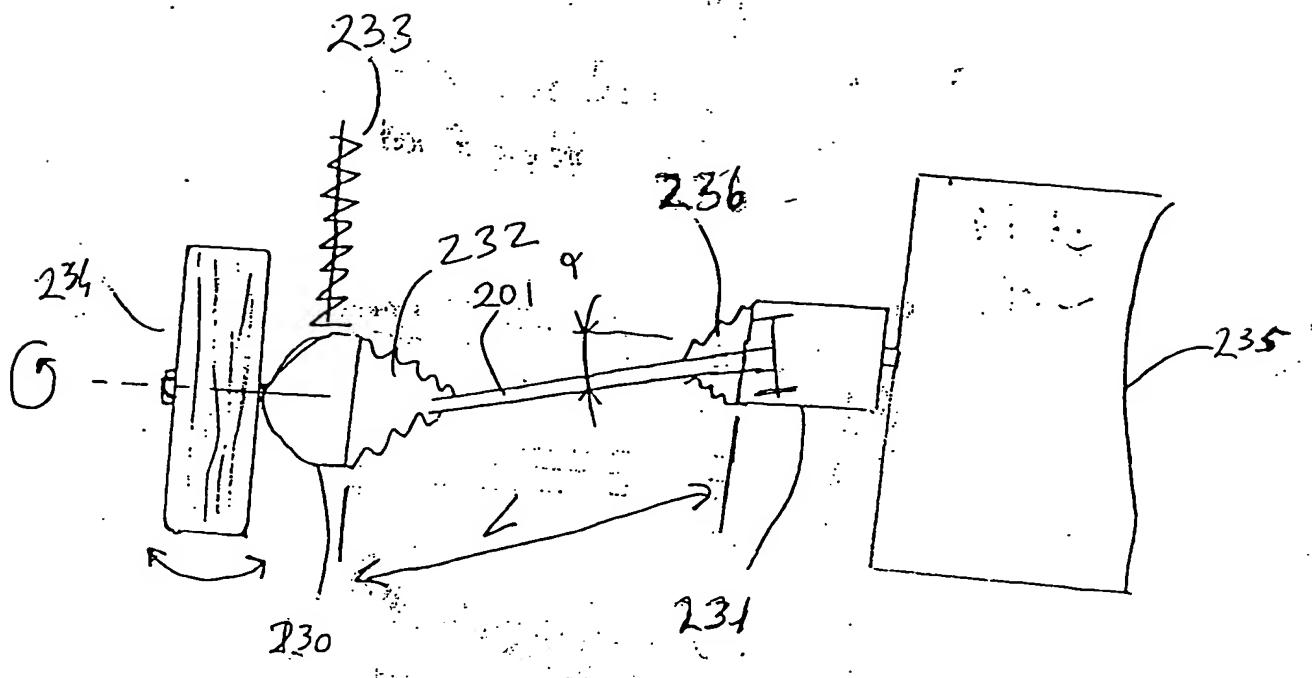


Figure 4

Spare

This Page Blank (uspto)

3 / 3

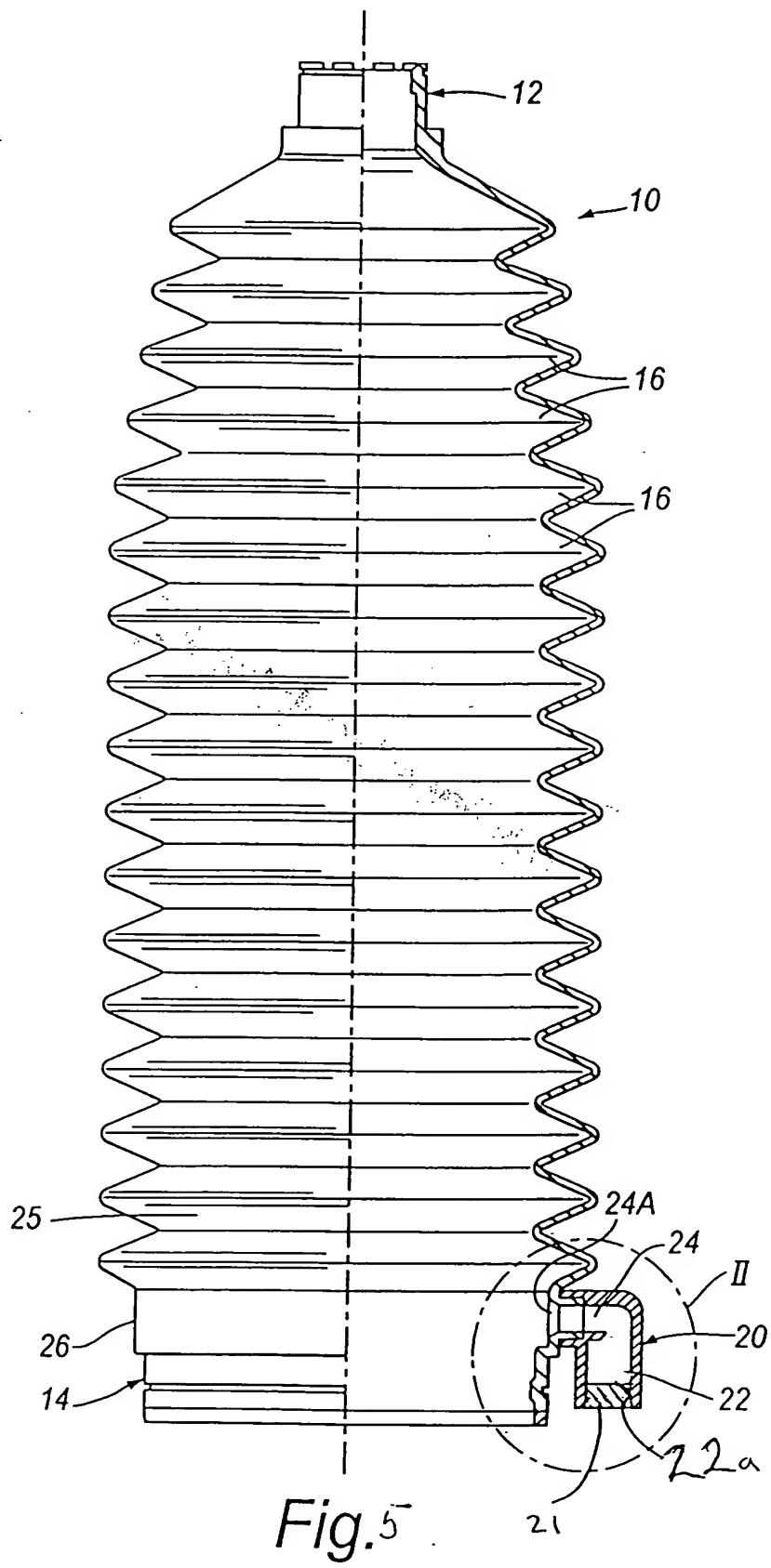


Fig. 5

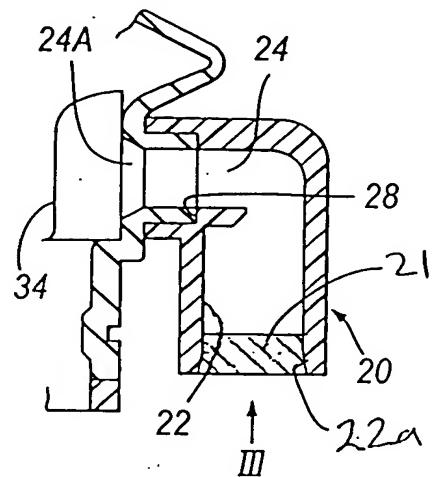


Fig.6

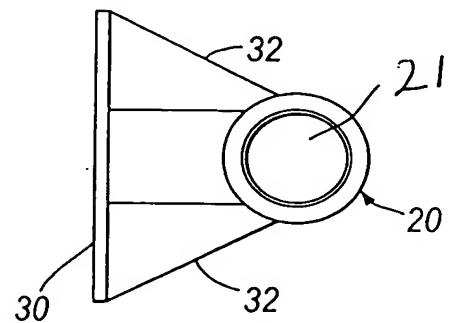


Fig.7

Space

This Page Blank (uspto)